WHAT IS CLAIMED IS:

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1. A method for teaching a welding torch orientation for executing the arc welding by a welding torch supported by a robot by the use of a robot controller having a software processing ability, said method including the steps of:

transferring position data previously obtained on a start point, an end point and junction points between sections on a weld line to the robot controller;

inputting a forward angle, or an inclined angle of the welding torch to the direction of a section, for each section;

obtaining a reference plane by teaching, or selecting one of planes previously prepared in the robot controller as a reference plane, and then inputting an inclination angle, or an inclined angle of the welding torch to the reference plane, for each section;

determining a desired torch orientation for each section by a software calculation processing, on the basis of the data on the respective points transferred to said robot controller, and said inputted inclination angle and forward angle;

setting auxiliary points in the periphery of the junction point, for a junction point that connects a straight-line section with another straight-line section, among said junction points; and

allocating the torch orientation for each of the set auxiliary points and junction points by the software calculation processing according to the arrangement of the points, so that the torch orientation is changed gradually from said desired torch orientation in the section behind the junction point to said desired torch orientation in the section before the junction point.

- 30 -

31

2.   A method for teaching a welding torch orientation for
executing the arc welding by a welding torch supported by
a robot by the use of a robot controller having a
software processing ability, said method including the
steps of:

teaching the position of a start point, an end
point and junction points between sections on a weld line
by robot jog feed operation, without imposing a specific
condition on the torch orientation;

inputting a forward angle, or an inclined angle of
the welding torch to the direction of a section, for each
section;

obtaining a reference plane by teaching, or
selecting one of planes previously prepared in the robot
controllers as a reference plane, and then inputting an
inclination angle, or an inclined angle of the welding
torch to the reference plane, for each section;

determining a desired torch orientation for each
section by a software calculation processing, on the
basis of the taught data on the respective points, and
said inputted inclination angle and forward angle;

setting auxiliary points in the periphery of the
junction point, for a junction point that connects a
straight-line section with another straight-line section,
among said junction points; and

allocating the torch orientation for each of the
set auxiliary points and junction points by the software
calculation processing according to the arrangement of
the points, so that the torch orientation is changed
gradually from said desired torch orientation in the
section behind the junction point to said desired torch
orientation in the section before the junction point.

3.   A method for teaching a welding torch orientation as

set forth in claim 2, wherein in executing the calculation of said basic welding orientation by the software processing, the state at the time of teaching by said jog feed operation is further reflected for the orientation around a torch axis.

4. A method of teaching a welding torch orientation as set forth in claim 1, 2 or 3, wherein said reference plane is defined by teaching a required plane to said robot.

5. A method of teaching a welding torch orientation for executing the arc welding by a welding torch supported by a robot, said method comprising the steps of:

(a) teaching the position data on a start point and end point of a weld line, and on connection points dividing the weld line into a plurality of straight-line sections;

(b) obtaining a reference plane by teaching, or by selecting one of planes already prepared in a robot controller;

(c) defining a three-axis rectangular coordinate system for each straight-line section, on the basis of the direction of the straight-line section and of the normal direction of the reference plane taught or selected in said (b);

(d) transforming a tool vector composed of a set of three rectangular unit vectors including a torch direction unit vector to an expression in the three-axis rectangular coordinate system behind in step (c);

(e) calculating first a taught inclination angle and a taught forward angle from the tool vector expressed in the three-axis rectangular coordinate system, the inclination angle being defined as an angle of the welding torch with respect to the plane, and the forward

angle as an angle of the welding torch with respect to
the direction of the section, and then, on the basis of
these angles, determining a taught spin angle as a taught
orientation with the torch direction taken as a axis;

(f) calculating the tool vector expressed in the
three-axis rectangular coordinate system determined in
said (c), from the taught spin angle obtained in said
(e), a forward angle specified by input, and an
inclination angle specified by input;

(g) obtaining a basic welding orientation in said
straight-line section, by transforming the calculated
tool vector obtained in said (f) to the expression in the
base coordinate system;

(h) setting one or two or more auxiliary points
spaced apart from each other by a predetermined distance
in the straight-line section before and/or behind a
junction point, with the junction point as a reference;

(i) specifying the basic welding orientation for
the straight-line section defined in said (g) to an
auxiliary point at the position most apart from the
junction point in the forward/rearward straight-line
section, among auxiliary points set in said (h); and

(j) allocating the torch orientation for remaining
auxiliary points and said junction points according to
the arrangement of the points, so that the torch
orientation is changed gradually from the basic torch
orientation for one straight-line section defined in said
(g) to the basic torch orientation for the other
straight-line section.

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